

Sustainable Water Management Initiative Advisory Committee

Presentation Title: Safe Yield Update

Date of Presentation: October 26, 2010

The following presentation is offered for discussion purposes only and does not necessarily represent current statute, regulation, or policy positions of the Commonwealth of Massachusetts unless specifically acknowledged.

This presentation is not to be cited as a reference. It's purpose is to foster open and broad discussion of the issues as well as help assure public awareness of the discussions as of the date of the presentation.



SAFE YIELD UPDATE

EEA SWMI ADVISORY COMMITTEE

Anne Carroll

Department of Conservation and Recreation

October 26, 2010

Components of Safe Yield

- Basin Yield, Drought/probable driest period (BY)
- Drought Environmental Protection Factor (EPF)
- Storage Volume (S)
- Other Considerations:
 - ▣ Time and Space
 - ▣ Alternatives where no SYE calculations
 - ▣ Consumptive Use
- Safe Yield Permitting Moving Forward

Comments Received

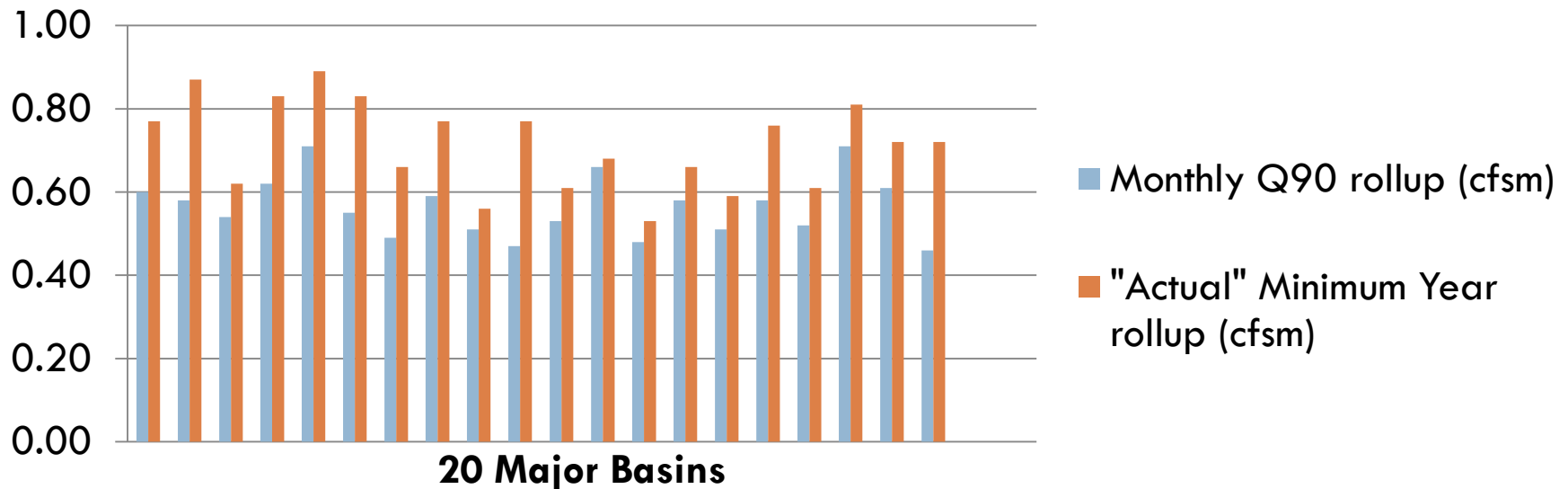
- Charles River Watershed Association
- Charlie Cooper
- Conservation Law Foundation
- Ipswich River Watershed Association
- Lee Steppacher, National Park Service
- Mass Rivers Alliance Workgroup
- Mass Water Works Association
- Paul Lauenstein
- The Nature Conservancy
- Watershed Action Alliance

General Comments on Safe Yield

1. Excellent work. The scientific basis for sustainable water management has never been stronger
2. Ruling out any method that results in exceedence of safe yield is unacceptable
3. EEA should acknowledge that some basins are over-allocated
4. Safe yield must remain a basin-wide, annual figure that serves as a screening tool to determine whether a basin even has water to allocate
5. SY must protect aquatic life when it is most stressed
6. SY methodology cannot allow existing 7Q10 flow to be reduced
7. SY should incorporate margin of safety

Basin Yield Options

- Option 1: Monthly Q90, annualized
- Option 2: Minimum Year in period of record (recurrence range <Q75 to Q90)
- Option 3: Monthly Q80, annualized



Comments on Basin Yield Options

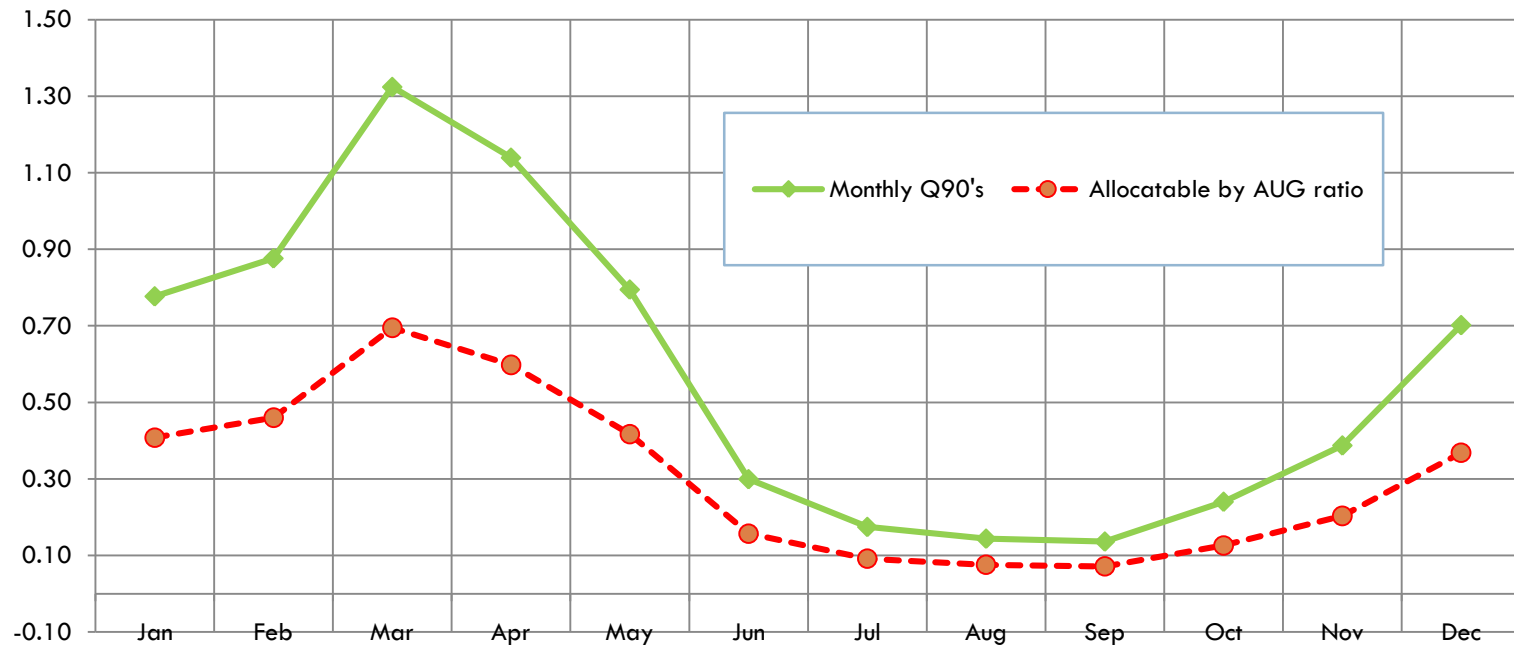
1. Support use of Q90 as basis of safe yield
2. Suggest using data from minimum flow year, closer to Q80
3. SY must be monthly or seasonal and based on severe summer drought to reflect the limited availability of water in summer
4. With roll-up of monthly values to an annual value, lose ability to specify monthly numbers for safe yield or allocations
5. Not appropriate to base SY on natural flow conditions that cannot be attained given the development that has occurred; should use actual recorded gage data
6. Temporal and spatial scales are best determined in streamflow criteria

Environmental Protection Factor

- Use 25% of August Median Flow (AMF) as target for Safe Yield, therefore 75% August Median flow for EPF
- Translates to 30% loss of fluvial density
- Determine portion of August Basin Yield equal to fraction that represents 25% of August Median (for Ipswich and Charles, ~50%)
- Apply percentage to other months
- Consider using lower percentages in non-summer months

Environmental Protection Factor: Example

Charles River Basin
Basin Yield = Monthly Q90's
Monthly Allocatable portion = 25% Aug Med / Aug Q90 = 52%



FOR DISCUSSION PURPOSES ONLY - NOT TO BE CITED

Comments on Environmental Protection Factor

1. Use of August median throughout the year does not make physical sense
2. A portion of August Q90 equaling 75% Aug median flow as EPF makes sense for August and potentially July and September; applying to non-summer months is not supported by F&F study and would result in over-allocation
3. Develop ecologically-based EPFs for non-summer months using existing scientific studies and expert opinion
4. To be consistent with annualized roll-up of basin yield, EPF should be based on annualized roll-up of August median flow

Storage Volume

DRAFT Storage Volumes

(for systems that can store more than one year of basin yield and system use)

□ Chicopee	250.2
□ Nashua	141.6
□ Westfield	62.6
□ Boston Harbor	1.6
□ Housatonic	0.12
□ Quinebaug	0.07

Consideration of Reservoir Releases

- Releases are most appropriately discussed under criteria/goals, not as part of the storage methodology

Comments on Storage Volume

1. Method for water storage should factor in flow releases/environmentally-protective diversion thresholds
2. Multi-year storage volume only, such as MWRA reservoirs
3. If reservoir systems are required to release, they may not have enough water to see them through a dry summer
4. Unclear how reservoir storage is being considered in safe yield

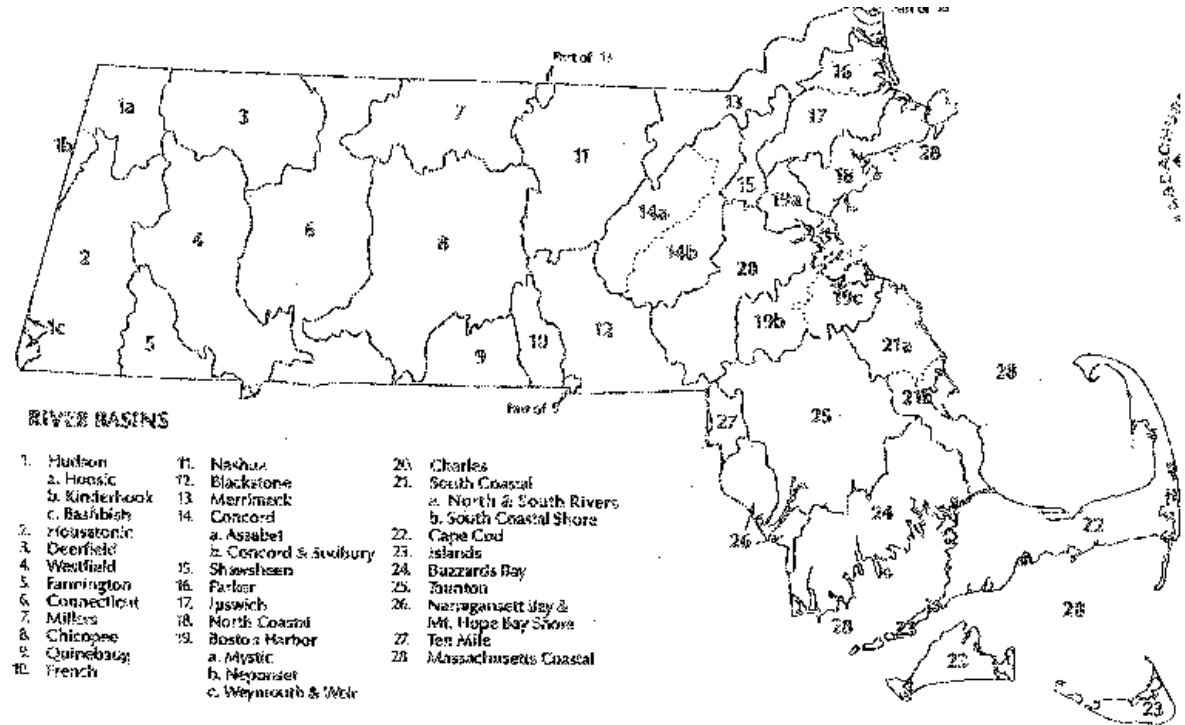
Time and Space: Scale

Use
“administrative”
split where
basins are
geographically
separated and
don't flow into
each other:

Boston Harbor

South Coastal

Hudson



Comments on Scale

1. Major basin scale does not work for South Coastal, Cape and Islands, and some other rivers. Develop individual SY for each hydrologically distinct watershed such as the Jones, Eel and other watersheds in the South Coastal basin; the Weymouth, Weir and Fore river watersheds in the Boston Harbor Basin.
2. Basin Scale acceptable b/c SY is a screening tool. Address seasonality and scale through streamflow criteria and allocation.
3. Support the administrative splits, but they do not go far enough to protect individual watersheds
4. SY should incorporate by reference, estimates of existing streamflow depletion at subbasin scale as documented in the MWI report
5. Express SY on a per square mile basis to address spatial issues

Calculating Basin Yield for non-SYE Basins

For Buzzards Bay, Cape Cod, Islands, Narragansett-Mt. Hope, North Coastal, and South Coastal

Continue to evaluate 3 options:

1. Use most similar basin and apply its basin yield (mgd/mi²)
2. Use data in SYE for Cape & Islands and Plymouth Carver Aquifer
3. Evaluate recharge numbers from DEP's October 2009 proposal

Comments on Calculating Basin Yield for non-SYE Basins

- Yields for Cape and Islands could be based on modeled natural streamflow from USGS groundwater studies.

Consumptive Use: components

- Returns that could be considered:
 - ▣ Septic Returns
 - ▣ Groundwater Discharges
 - ▣ Surface Water Discharges
- Removals that could be considered:
 - ▣ Public withdrawals
 - ▣ Private well withdrawals
 - ▣ Infiltration and Inflow

Consumptive Use: pros and cons

□ Pros:

- ▣ Giving credit/accounting for returns
- ▣ Giving credit for keeping water local

□ Cons:

- ▣ Water Quality concerns
 - ▣ Data Quality concerns
 - ▣ Don't have a method for I/I estimate
- Site specific consideration during allocation may be most appropriate

Comments on Consumptive Use

1. Water returned to the basin should be counted as a credit on the allocation side.
2. Water used for non-consumptive uses must be returned unimpaired.
3. Factor in other water losses, including I/I and private wells.
4. In comparing SY to permitted withdrawals, withdrawals should include private well withdrawals and build in a 5% growth factor.
5. Credits for returns should be addressed through mitigation provision in permits.

SAFE YIELD PERMITTING MOVING FORWARD

SHARED ASSUMPTIONS

SCENARIOS AND TOOLS

EEA SWMI ADVISORY COMMITTEE

Laurie Burt, Commissioner

Department of Environmental Protection

October 26, 2010

Safe Yield Permitting Moving Forward

21

- Some of the Options for Safe Yield raised by members of the Advisory Committee have suggested that in some places withdrawals could exceed a new Safe Yield. If this is the case, what are the legal/practical paths forward, including those that will avoid major water supply problems in communities while assuring future use that does not exceed Safe Yield?

Shared Assumptions

22

- Protect and Improve Water Resources
- Maintain Water Supplies
- Allow for growth/development
- Use Existing Permitting Tools

Scenarios and Tools

23

1. Safe Yield – potential exceedances today
2. Safe Yield not exceeded today; sustainable water goals drive changes in the future
 - EPF changes over time
 - Sustainable allocation changes over time
 - Streamflow goals drive changes over time

Scenarios and Tools Continued

24

3. Streamflow Criteria and Goals

- Basin-wide goals
- Optimization and management goals
- Permit specific goals
- Statewide strategies

4. Other Tools